Criterios de transfusión en el recién nacido

Dr. Mario Alberto Noya Rodríguez
Hematología Pediátrica

Objetivos

- Historia de componentes sanguíneos
- Generalidades de medicina transfusional
- Aspectos de la medicina transfusional en el neonato
- Indicaciones de Componentes sanguíneos
- Conclusiones

1667

“sangre suave y loable de animal, menos contaminada de vicios y pasiones”

Shander A, Goodnough L. Why an alternative to blood transfusion?. Crit Care Clin. 2009;25(2):261-77.

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Canadian Blood Services

British Society for Haematology
Listening • Learning • Leading

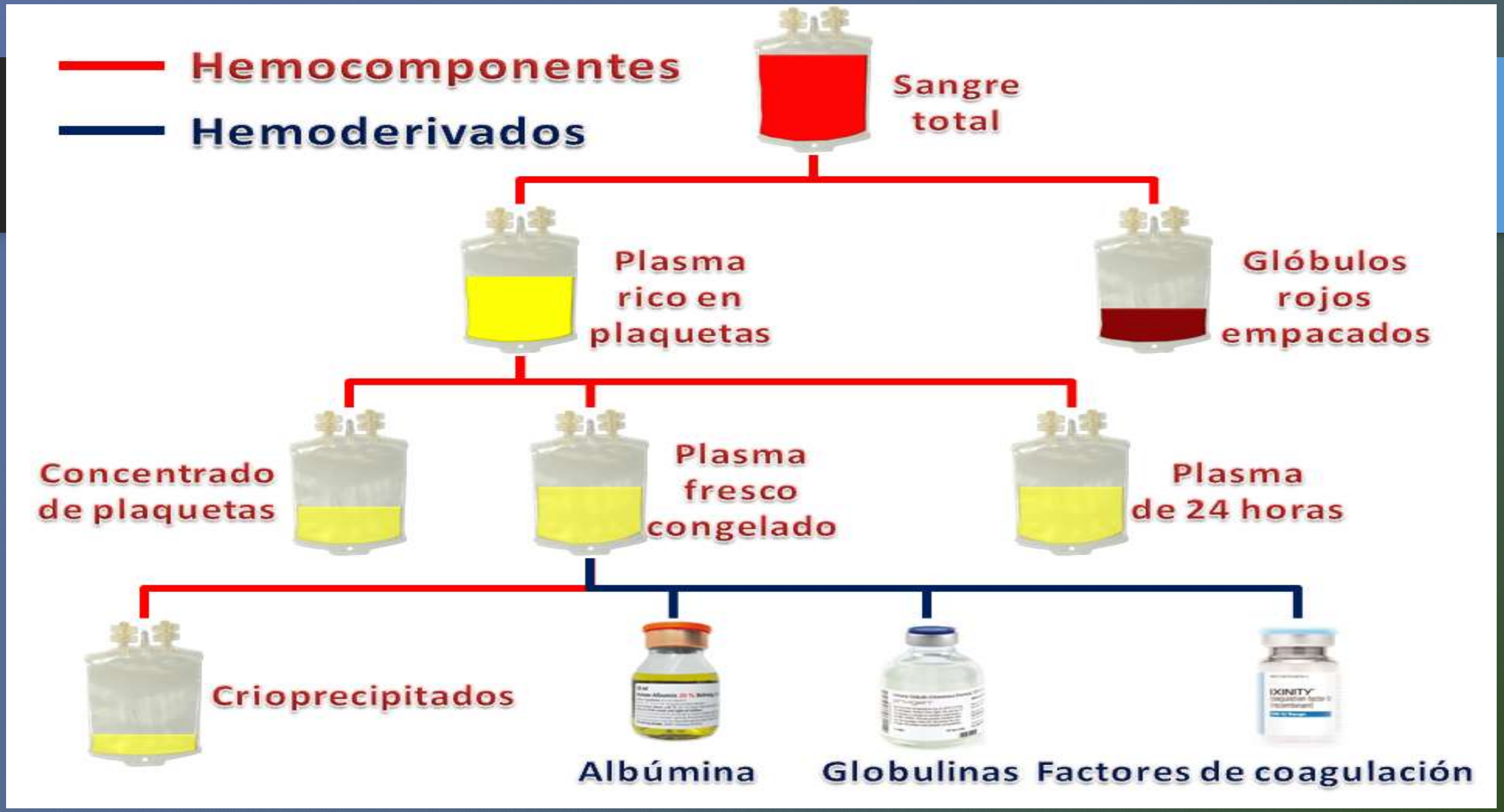
American Society of Hematology
Helping hematologists conquer blood diseases worldwide

NICE
National Institute for Health and Care Excellence

NHS Blood and Transplant

JPAC Joint United Kingdom (UK) Blood Transfusion and Tissue Transplantation Services Professional Advisory Committee

NOM -003-SSA2-1993 → NOM-253-SSA1-2012 → Guías transfusionales


Hemocomponentes
Hemoderivados
Sangre total
Plasma rico en plaquetas
Glóbulos rojos empacados
Concentrado de plaquetas
Plasma fresco congelado
Plasma de 24 horas
Crioprecipitados
Albúmina
Globulinas
Factores de coagulación

GENERALIDADES

> Mayor volumen sanguíneo

Respuesta fisiológica a la anemia

Sistema humoral inmune

Soluciones aditivitas y conservadores

Neonatology 2018;114:7–16

Tabla I

Rangos de referencia ajustados a la edad del paciente para las pruebas básicas de coagulación, factores de la coagulación y principales anticoagulantes naturales (8)

	Día 1	Día 3	1 mes-1 año	1-5 años	6-10 años	11-16 años
TTPa (s)	38,7 (34,3-44,8)	36,3 (29,5-42,2)	39,3 (35,1-46,3)	37,7 (33,6-43,8)	37,3 (31,8-43,7)	39,5 (33,9-46,3)
TP (s)	15,6 (14,4-16,4)	14,9 (13,5-16,4)	13,1 (11,5-15,3)	13,3 (12,1-14,5)	13,4 (11,7-15,1)	13,8 (12,7-16,1)
INR	1,26 (1,15-1,35)	1,20 (1,05-1,35)	1,00 (0,86-1,22)	1,03 (0,92-1,14)	1,04 (0,87-1,20)	1,08 (0,97-1,30)
Fibrinógeno (g/l)	2,80 (1,92-3,74)	3,30 (2,83-4,01)	2,42 (0,82-3,83)	2,82 (1,62-4,01)	3,04 (1,99-4,09)	3,15 (2,12-4,33)
FII (%)	54 (41-69)	62 (50-73)	90 (62-103)	89 (70-109)	89 (67-110)	90 (61-107)
FV (%)	81 (64-103)	122 (92-154)	113 (94-141)	97 (67-127)	99 (56-141)	89 (67-141)
FVII (%)	70 (52-88)	86 (67-107)	128 (83-160)	111 (72-150)	113 (70-156)	118 (69-200)
FVIII (%)	182 (105-329)	159 (83-274)	94 (54-144)	110 (36-185)	117 (52-182)	120 (50-200)
FIX (%)	48 (35-56)	72 (44-97)	71 (43-121)	85 (44-127)	96 (48-145)	111 (64-216)
FX (%)	55 (46-67)	60 (46-75)	95 (77-122)	98 (72-125)	97 (68-125)	91 (53-122)
FXI (%)	30 (7-41)	57 (24-79)	87 (62-125)	113 (65-162)	113 (65-162)	111 (65-139)
FXII (%)	58 (43-80)	53 (14-80)	79 (20-135)	85 (36-135)	81 (26-139)	75 (14-117)
AT (%)	76 (58-90)	74 (60-89)	109 (72-134)	116 (101-131)	114 (95-134)	111 (96-126)
PC (%)	36 (24-44)	44 (28-54)	71 (31-112)	96 (65-127)	100 (71-129)	94 (66-118)
PS (%)	36 (28-47)	49 (33-67)	102 (29-162)	101 (67-136)	109 (64-154)	103 (65-140)

AT: antitrombina; PC: proteína C; PS: proteína S; INR: International Normalized Ratio; TP: tiempo de protrombina; TTPa: tiempo de tromboplastina parcial activado.

Age	Hemoglobin concentration (g/l) (mean (- 2 SD))		
	Preterm*		Term
	1.0-1.5 kg	1.5-2.0 kg	
2 weeks	163 (117)	148 (118)	165 (125)
1 month	109 (87)	115 (82)	140 (100)
2 months	88 (71)	94 (80)	115 (90)
3 months	98 (89)	102 (93)	115 (95)

Canadian Blood Services. 2017.

Criterios transfusionales

Protector neurológico

Restrictivo

Liberal

Epo – Anemia fisiológica

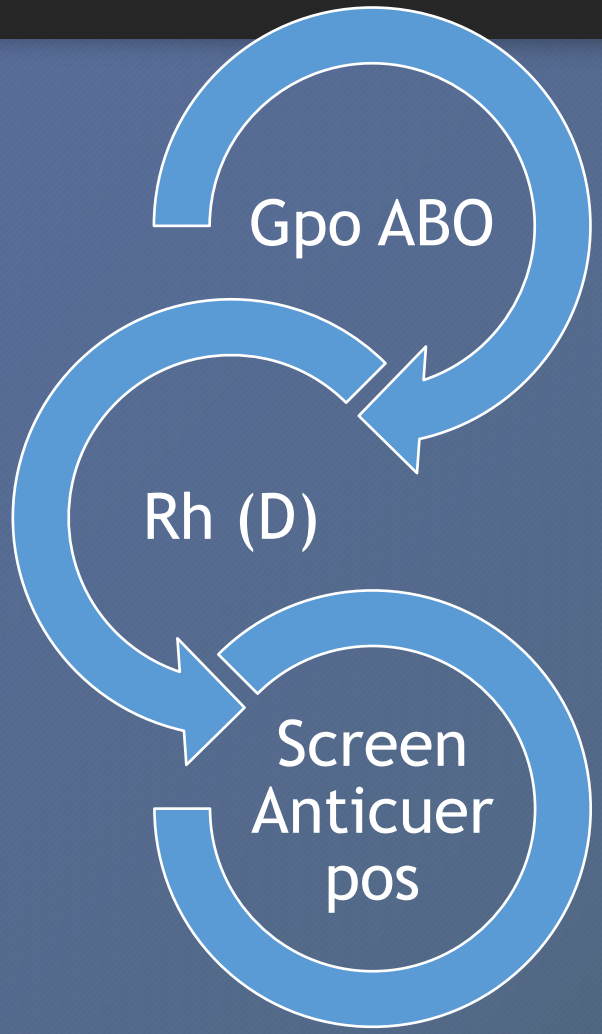
Neonatology 2018;114:7–16

Criterios Restrictivos

- [redacted]
- TACO
- Hiperkalemia
- Hemolisis
- EICHt
- Sensibilidad a antígenos eritrocitarios
- Infecciones

Canadian Blood Services. 2017.

Test Pre – Transfusional



Canadian Blood Services. 2017.

Componentes Sanguíneos Leucoreducidos

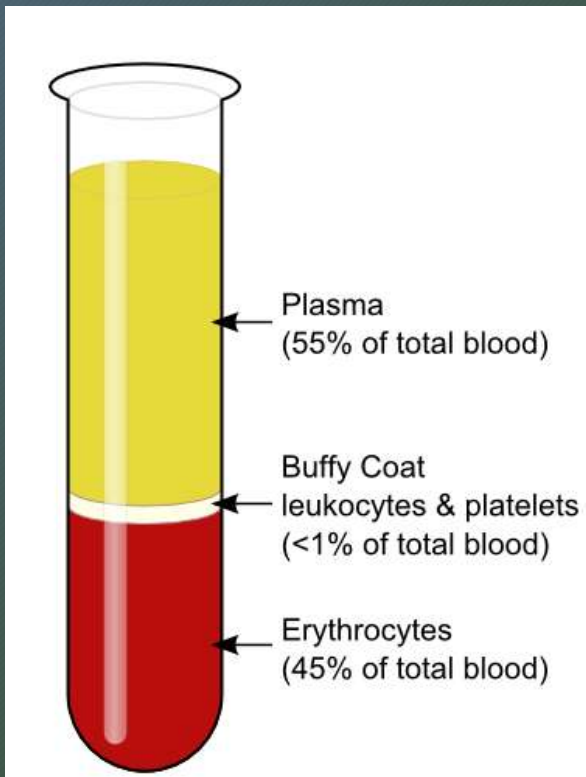
US: 1-5x 10^9 Leucocitos

Leucodepletado

1-5x 10^8 (centrifugación)

Leucoreducido

1-5x 10^6 (filtro de adsorción



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Transfusión de Concentrado Eritrocitario

Canadian Blood Services. 2017.

Controversia

- HbF vs HbA
- Evaluacion clinica
- Falta de consenso: síntomas principales
- Reflejo Hb / Hto

Canadian Blood Services. 2017.

Consenso / Publicación

Postnatal age	Hemoglobin, g/l (hematocrit, %)	
	With respiratory support*	No respiratory support
0 to 7 days	115 (35)	100 (30)
8 to 14 days	100 (30)	85 (25)
>14 days	85 (25)	75 (23)

Canadian Blood Services. 2017.

Dosis	Eleva Hb	CE
•10-20 ml/kg	•2 gr/dl	•<5 días

Canadian Blood Services. 2017.

	Estimated Hb (g/L) after transfusion		
Current Hb (g/L)	Transfusion of 10mL/kg	Transfusion of 15mL/kg	Transfusion of 20 mL/kg
Very preterm neonate with estimated blood volume 100 mL/kg			
70 g/L	91 g/L	102 g/L	112 g/L
80 g/L	101 g/L	112 g/L	122 g/L
90 g/L	111 g/L	122 g/L	132 g/L
Term neonate with estimated blood volume 80 mL/kg			
70 g/L	96 g/L	109 g/L	123 g/L
80 g/L	106 g/L	119 g/L	133 g/L
90 g/L	116 g/L	129 g/L	143 g/L

Pedipacks

- Gpo O+ O-
- CMV Negativo
- Irradiados

Uso de Epo

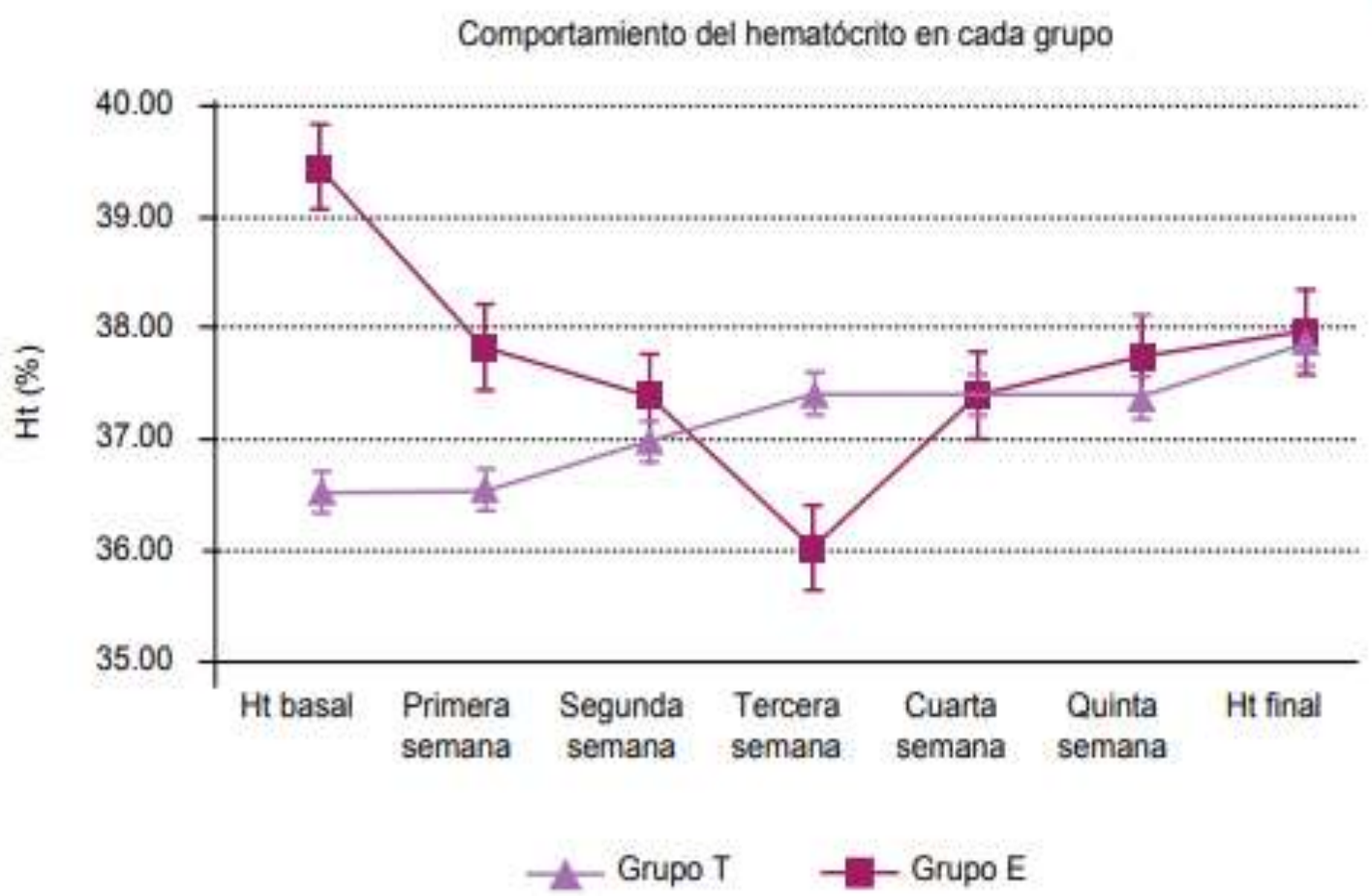


Figura 1 Comportamiento del hematócrito en cada grupo

López-Catzín JF et al. Eritropoyetina y transfusiones en la anemia del prematuro 2016

Table 1. Comparison of BCSH, American, Australian, and Canadian practice guidelines for RBC transfusion in newborn infants

Clinical status	BCSH guideline	American Red Cross practice guideline	Australian National Blood Authority guideline	Canadian Blood Services guideline
Anaemia in the first 24 h	Hb <12 g/dL or Hct <0.36	–	No respiratory support: Hb 10–12 g/dL Respiratory support Hb 11–13 g/dL	On ECMO and congenital cyanotic heart disease Hb <15 g/dL
Infants receiving intensive care Severe cardiopulmonary disease (FiO_2 >0.35)	Hb <12 g/dL or Hct <0.36	Hct 40–45%	Hb 11–13 g/dL	Hb <12 g/dL
Chronic oxygen dependency Moderate cardiopulmonary disease (CPAP or O_2)	Hb <11 g/dL	Hct 30–35%	Hb 8.5–11 g/dL	Hb <10 g/dL
Late anaemia, stable patient	Hb <7 g/dL	Hct 20–25%	Hb 7–10 g/dL	Hb <7 g/dL

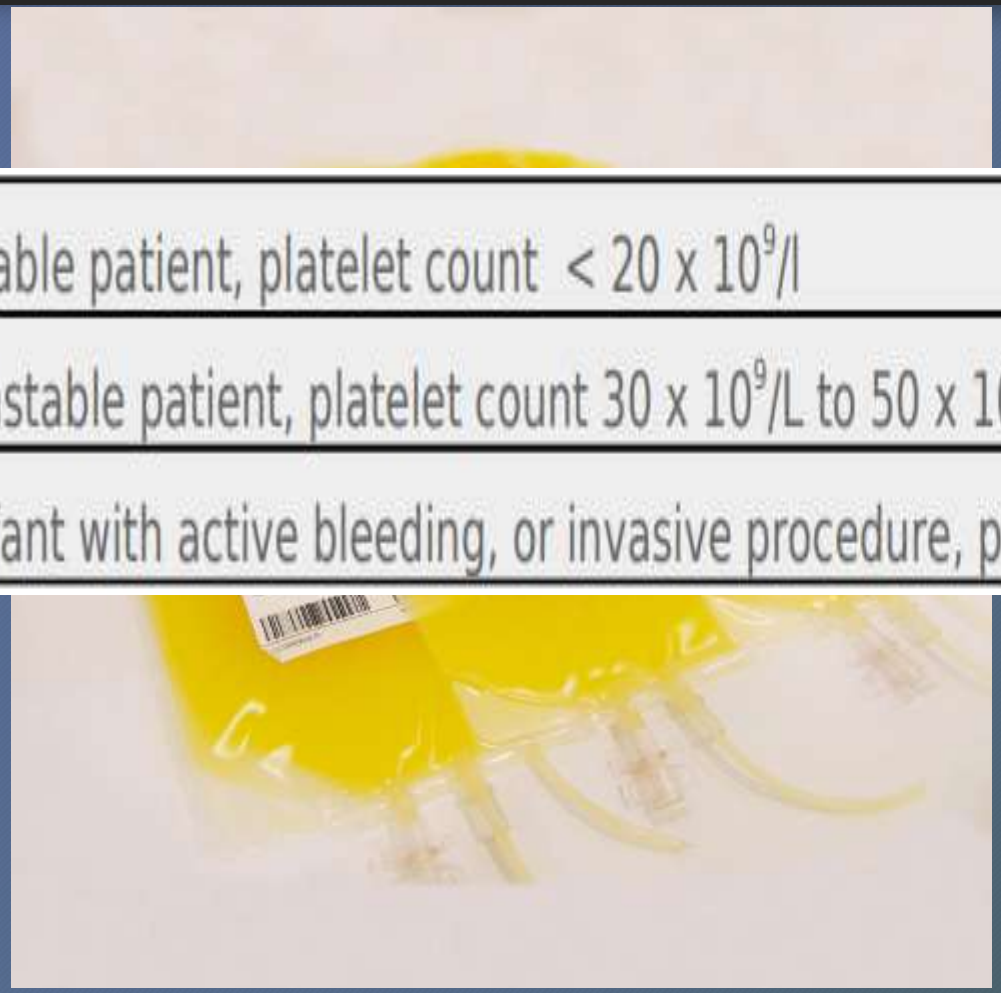
BCSH, British Committee for Standards in Haematology; Hb, haemoglobin; Hct, haematocrit; CPAP, continuous positive airway pressure.

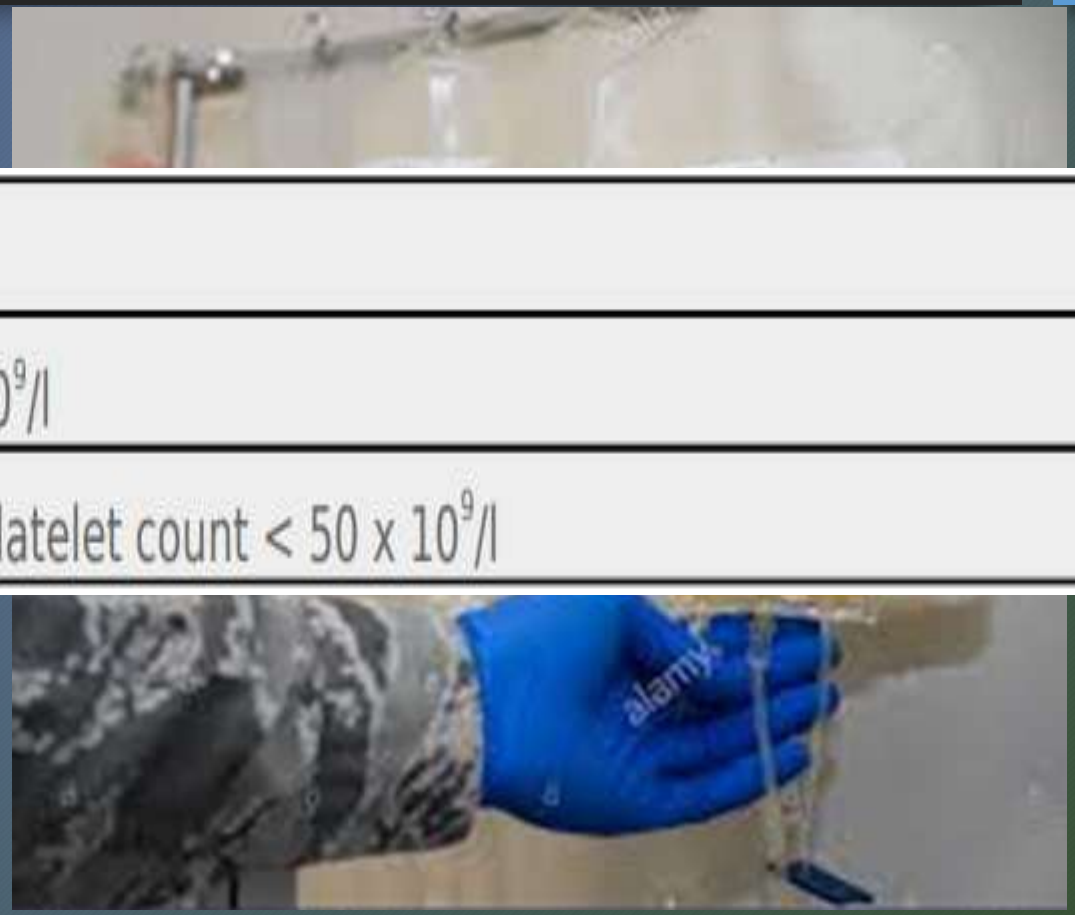
Table 2. Hb threshold levels used by different randomized trials for RBC transfusions

Trial	Restrictive threshold	Liberal threshold
Blank et al. [5]	Transfusion according to clinical indication	Transfuse if Hb <100 g/L
Ransome et al. [21]	Hb levels <70 g/L or clinically symptomatic	Hb levels <100 g/L
Brooks et al. [10]	RBC transfusion when clinically symptomatic	RBC transfusion if Hb <133 g/L
Connelly et al. [22]	1st post-natal week: 110 g/L 2nd post-natal week: FiO_2 >40%, 110 g/L; FiO_2 <40%, 90 g/L 3rd post-natal week: 80 g/L[a]	1st postnatal week: 130 g/L 2nd postnatal week: FiO_2 >40%, 130 g/L; FiO_2 <40%, 100 g/L 3rd postnatal week: 80 g/dL*a*
Mukhopadhyay et al. [23]	Hb levels ≤100 g/L or Hct ≤30%	Hb levels ≤133 g/L or Hct ≤ 40%
Bell et al. [15]	Intubated: 113 g/L O_2 or CPAP: 93 g/L No respiratory support: 67 g/L	Intubated: 153 g/L O_2 or CPAP: 127 g/L No respiratory support: 73 g/L
Kirpalani et al. [6]	*For infants requiring respiratory support (ventilation, CPAP, or oxygen):* Post-natal week 1: 115 g/L Week 2: 100 g/L Week 3 till discharge: 85 g/L *For infants not requiring respiratory support:* Postnatal week 1: 100 g/L Week 2: 85 g/L Week 3 till discharge: 75 g/L	*For infants requiring respiratory support (ventilation, CPAP, or oxygen):* Post-natal week 1: 135 g/L Week 2: 120 g/L Week 3 till discharge: 100 g/L *For infants not requiring respiratory support:* Post-natal week 1: 120 g/L Week 2: 100 g/L Week 3 till discharge: 85 g/L
Chen et al. [24]	Intubated: 116 g/L CPAP: 100 g/L No respiratory support: 73 g/L	Intubated: 150 g/L CPAP: 133 g/L No respiratory support: 100 g/L

CPAP, continuous positive airway pressure; Hb, haemoglobin; Hct, haematocrit; RBC, red blood cell. [a] When capillary rather than central bloods were sampled the thresholds were 4% higher.

Transfusión de Concentrado plaquetario





1. Stable patient, platelet count $< 20 \times 10^9/l$
2. Unstable patient, platelet count $30 \times 10^9/L$ to $50 \times 10^9/l$
3. Infant with active bleeding, or invasive procedure, platelet count $< 50 \times 10^9/l$

Canadian Blood Services. 2017.

Platelet count (x10^9/L)	Clinical situation to trigger platelet transfusion in *neonates*
<25 - 30	Stable term or preterm infant with asymptomatic thrombocytopenia and no bleeding
30 - 50	Sick preterm infant with thrombocytopenia
<50	Term or preterm infant with symptomatic thrombocytopenia and minor bleeding, coagulopathy or prior to surgery.
<100	Term or preterm infant with symptomatic thrombocytopenia and major bleeding or requiring major surgery (e.g. neurosurger

- Gpo ABO compatible
- Evitar dar Rh (D) + a Rh (-)
- Irradiadas
- < 5 dias

Dosis	Objetivo	Refractariedad
• 5-10 ml/kg	• >50 mil Plaq	• Aloinmunizacion

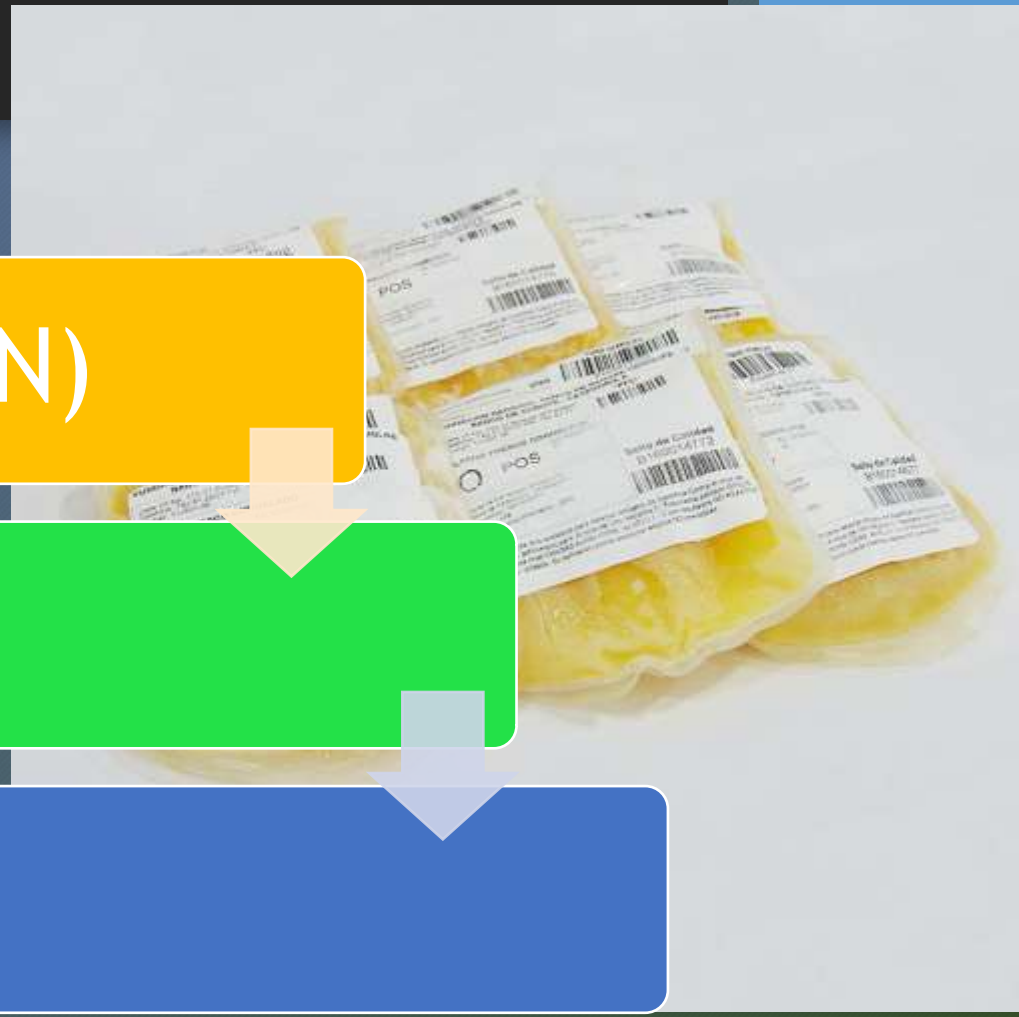
Canadian Blood Services. 2017.

Transfusión de PFC

Compatible antígenos GR (RN)

Gpo idéntico

Gpo AB



Canadian Blood Services. 2017.

- Iniciar Transfusión 30
- Completar a las 4 hrs
- No depleción o irradiación

Canadian Blood Services. 2017.

1. Replacement therapy in a bleeding patient or one about to undergo invasive procedure
2. When specific factor concentrates are not available, including but not limited to Factors II, VII, X, and XI, protein C or S
3. PT/INR >1.5 x mid-range of age-related normal value and/or PTT >1.5 x top of age-related normal value in a bleeding patient or one about to undergo invasive procedure
4. During therapeutic plasma exchange when Plasma is indicated
5. Reversal of warfarin in an emergency situation, such as before an invasive procedure with active bleeding (consider use of prothombin complex concentrate if available)

Canadian Blood Services. 2017.

Dosis

- 10-15 ml/kg

Actividad

- 20%

Canadian Blood Services. 2017.

Transfusión de Crioprecipitados

- Volumen 20-30 ml
- 5-10 ml/kg
- 30 min descongelar
- No leucodepletados
- No Irradiados

Canadian Blood Services. 2017.

Productos irradiados

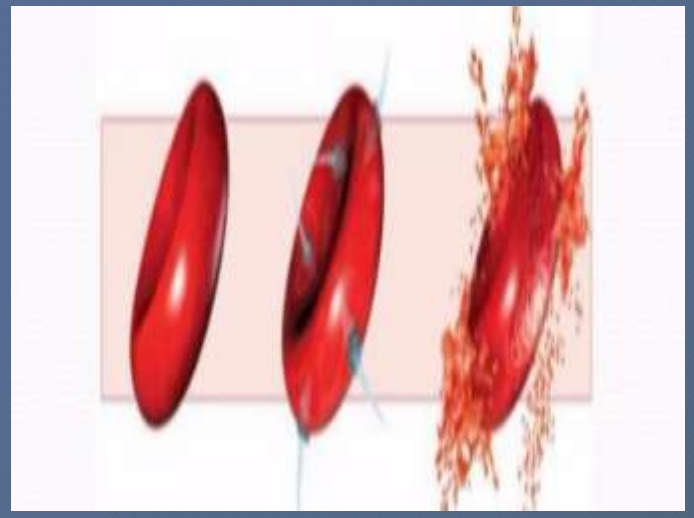
- < EICH t
- 25 cGy
- <14 días (uso)

Absolutas	Transfusión intrauterina
	Exanguinotransfusión
	Donador 1ra – 2da línea
	inmunodeficiencia
	<1200 gr

Canadian Blood Services. 2017.

Activación de Linfocitos T

Reacción transfusional hemolítica → Antígenos T – anticuerpos anti T → Neuroaminidasa (Clostridium S.)



Neuroaminidasa (Clostridium S.) → Asociado a NEC

Neonatology 2018;114:7–16

Conclusiones

- Indicaciones precisas para Transfundir
- Transfusión Restrictiva
- Hemovigilancia
- Transfusión segura

- “La transfusión más segura es la que no se hace”